



## Change in the odds of warm years and seasons due to anthropogenic influence on the climate

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### Abstract:

The new Hadley Centre system for attribution of weather and climate extremes provides assessments of how human influence on the climate may lead to a change in the frequency of such events. Two different types of ensembles of simulations are generated with an atmospheric model to represent the actual climate and what the climate would have been in the absence of human influence. Estimates of the event frequency with and without the anthropogenic effect are then obtained. Three experiments conducted so far with the new system are analyzed in this study to examine how anthropogenic forcings change the odds of warm years, summers, or winters in a number of regions where the model reliably reproduces the frequency of warm events. In all cases warm events become more likely because of human influence, but estimates of the likelihood may vary considerably from year to year depending on the ocean temperature. While simulations of the actual climate use prescribed observational data of sea surface temperature and sea ice, simulations of the nonanthropogenic world also rely on coupled atmosphere-ocean models to provide boundary conditions, and this is found to introduce a major uncertainty in attribution assessments. Improved boundary conditions constructed with observational data are introduced in order to minimize this uncertainty. In more than half of the 10 cases considered here anthropogenic influence results in warm events being 3 times more likely and extreme events 5 times more likely during September 2011-August 2012, as an experiment with the new boundary conditions indicates.

**Source:** <http://dx.doi.org/10.1175/JCLI-D-13-00563.1>

### Resource Description

#### Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Quality, Temperature

**Food/Water Quality:** Other Water Quality Issue

**Water Quality (other):** Sea surface temperature

**Temperature:** Extreme Cold, Extreme Heat, Fluctuations

#### Geographic Feature:

resource focuses on specific type of geography

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None or Unspecified

## **Geographic Location:**

resource focuses on specific location

Global or Unspecified

## **Health Impact:**

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

## **Model/Methodology:**

type of model used or methodology development is a focus of resource

Exposure Change Prediction, Methodology

## **Resource Type:**

format or standard characteristic of resource

Research Article

## **Timescale:**

time period studied

Long-Term (>50 years)

## **Vulnerability/Impact Assessment:**

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content